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ABSTRACT

Developed by a statewide committee in response to the legislature's mandate to develop statewide curriculum standards for required subjects, this guide presents the content that should be taught in Mathematics II. It was piloted by teachers in representative school systems and subsequently revised. Seven goals for the course are listed, followed by a pacing chart suggesting the time to devote to each major topic in each of the two semesters of the course. The major topics are number concepts, operations on whole numbers, rational numbers. decimals, percent, introduction to algebra, linear equations and inequalities, coordinate system, factoring, and informal geometry. The curriculum outline and performance objectives are then listed. In the following section, sample activities are presented, with content topic and objective noted for each. A brief list of books is given, evaluation techniques are noted, and an answer key to activities is provided. (MNS)

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MATHEMATICS II

CURRICULUM GUIDE

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BULLETIN 1161

REVISED 1983

Louisiana Department of Education

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State Superintendent

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STATE OF LOUISIANA

DEPARTMENT OF EDUCATION

MATHEMATICS II CURRICULUM GUIDE

BULLETIN 1611

REVISED 1983

Issued by

Office of Academic Programs

J. KELLY NIX

State Superintendent

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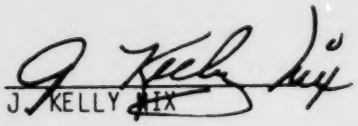
FOREWORD

Curriculum guides have been developed for grades K-8 at the elementary level and for each mathematics course at the secondary level. These guides represent the best thinking of a selected statewide committee established to determine the scope of mathematics content which should be taught at each level.

The mathematics curriculum guides are another segment of the total educational program established by this administration and mandated by the Legislature in both the accountability and assessment and the competency-based education laws. This educational program requires that specific skills and concepts be established for each grade level and for each subject area. The mathematics curriculum guides with course outlines, performance objectives and coordinated activities effect this phase of the program.

It is hoped that the mathematics curriculum guides will make a major contribution to the improvement of mathematics instruction in the schools of Louisiana. This series of mathematics curriculum guides is another step toward achieving the goals of this administration.



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ACKNOWLEDGMENTS

The Statewide Mathematics Curriculum Committee is to be commended for its work in the development of the Mathematics Curriculum Guide Series, K-12. Leadership for this project was provided by Dr. Jean Reddy Clement, Section Chief, Mathematics Section, Bureau of Secondary Education.

Supervisors in the Bureau of Elementary Education working under the direction of Mrs. Bonnie Ross, Elementary Supervisor, developed the activities for the K-8 guide. The activities for the secondary mathematics guides were written by a committee of secondary mathematics teachers and Dr. Clement. These dedicated educators are to be commended for their enthusiasm in undertaking this formidable project and for the superb quality of their contributions to this unique and comprehensive Mathematics Curriculum Series.

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INTRODUCTION

Act 750 of the 1979 Louisiana Legislature (R.S. 17:24.4) established the Louisiana Competency-Based Education Program. One of the most important provisions of Act 750 is the mandated "development and establishment of statewide curriculum standards for required subjects for the public elementary and secondary schools of this state . . ." The "statewide curriculum standards for required subjects" is defined as "the required subjects to be taught, curriculum guides which contain minimum skills and competencies, suggested activities, suggested materials of instruction, and minimum required time allotments for instruction in all subjects." Act 750 further provides that the "effective implementation date of the statewide curriculum standards for required subjects shall be the 1981-82 school year. Development of such curriculum shall begin by the 1979-80 school year."

During the 1978-79 school year, curriculum guides were developed by advisory and writing committees representing all levels of professional education and all geographic areas across the State of Louisiana for the following mathematics courses: Algebra I, Algebra II, Geometry, Advanced Mathematics, and Trigonometry. The major thrust of the curriculum development process in each of the guides has been the establishment of minimum standards for student achievement. Learning expectancies for mastery have been determined for each course/and or grade level. In addition, content outlines, suggested activities, procedures, and bibliographies have been developed as aids in support of the learning expectancies. The curriculum guides also contain activities designed to stimulate learning for those students capable of progressing beyond the minimums.

During the 1979-80 school year, the curriculum guides were piloted by teachers in school systems representing the different geographic areas of the state as well as urban, suburban, inner-city, and rural schools. The standard populations involved in the piloting reflected also the ethnic composion of Louisiana's student population. Participants involved in the piloting studies used the curriculum guides to determine the effectiveness of the materials that were developed. Based upon the participants' recommendations at the close of the 1979-80 pilot study, revisions were made in the curriculum guides to ensure that they are usable, appropriate, accurate, comprehensive, relevant, and clear. These curriculum guides were implemented statewide in the 1980-81 school year. Following the established curriculum development procedures, curriculum guides for Mathematics I, Mathematics II, Consumer Mathematics, Business Arithmetic, and Computer Science were developed in 1979-80 and piloted in 1980-81. These curriculum guides were implemented statewide in 1981-82. This revision of the original guide has been prepared from suggestions collected statewide from teachers who have used the guide.

As curriculum guides are implemented, the following guidelines should prove helpful:

. . . curriculum standards should be considered as the foundation for the year's instructional program. Where other programs are already in operation, these curricular materials must be checked with the foundation curricula to ensure that appropriate course and/or grade level standards are included and maintained.

. . . curricular activities contained in the guides provide a number of suggestions for helping students to achieve the established standards. Activities to meet the needs of "average," "below average," and "above average" students have been included in the appropriate guides. These activities should prove helpful as the teacher plans and organizes instruction. Additional activities, however, may supplement or be used in lieu of those listed in the guide as long as these activities are designed to achieve similar specific objectives.

. . . curricular suggestions for meeting the needs of the special child have been prepared by the Division of Special Education. These suggestions are designed to provide help for teachers who work with special children in the regular classroom.

The continued effort of mathematics teachers to provide quality instruction will enhance our statewide goal to ensure that every student in the public elementary and secondary schools of the State of Louisiana has an opportunity to attain and to maintain skills that are considered essential to functioning effectively in society.

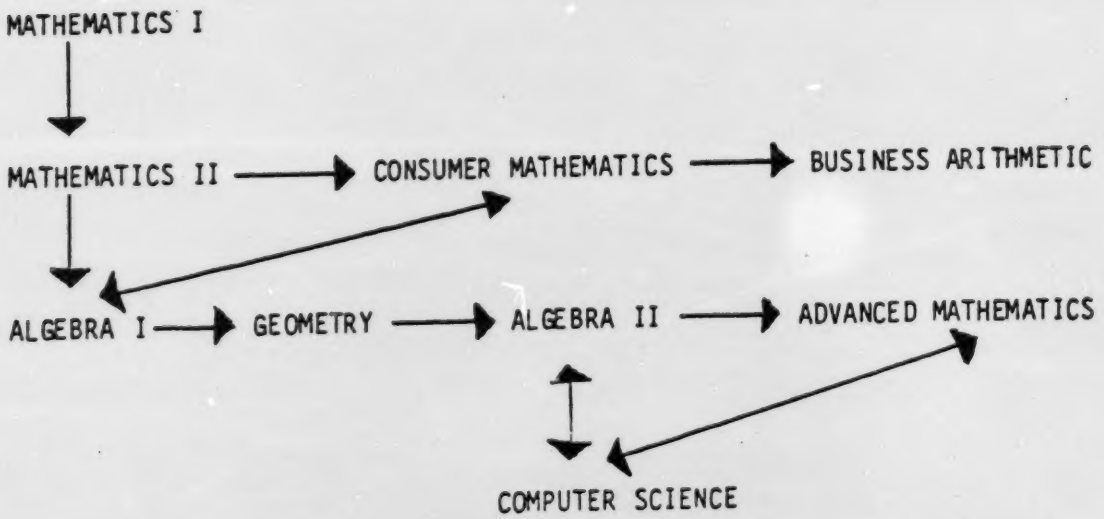
RATIONALE

Understanding the development of the entire set of mathematics curriculum guides is important to the proper use of the guides. This understanding is especially vital to the proper placement of students in the areas of Mathematics I, Mathematics II, Consumer Mathematics and Business Arithmetic. To avoid unnecessary duplication and repetition of content, the writing committee selected those topics which were deemed most appropriate for each of these courses. These topics were then eliminated from the content of the other courses or were treated with less emphasis.

Teachers and counselors need also to be aware of the difficulty levels of these courses. Mathematics I is the most fundamental course and is designed for those students entering ninth grade who have not acquired the basic skills in arithmetic. The stronger students who are still not quite prepared for success with Algebra I upon entering ninth grade should be encouraged to schedule Mathematics II. Mathematics II is designed to strengthen mathematical background and to prepare students for Algebra I and Geometry. Every student who plans to go to college should take Algebra I (at least). It is recommended that they also take Geometry and Algebra II.

Consumer Mathematics, as the name indicates, treats that mathematics which each of us encounters routinely as a citizen and consumer. The content differs from that of Business Arithmetic in that Business Arithmetic approaches the topics from the viewpoint of an employer or one engaged in business or manufacturing. It is not recommended that a student who has successfully completed Algebra II be allowed to take Mathematics I or Mathematics II.

The accompanying diagram should aid in understanding some possible avenues a student may take in his secondary mathematics career.



GOALS

Upon completion of a secondary course in Mathematics II, a student will be able to:

1. Demonstrate an understanding of the concepts of numbers.
2. Perform computations involving whole numbers, rational numbers, decimals and percents.
3. Develop an understanding of elementary algebra, including operations on polynomials.
4. Find solutions to linear equations, inequalities, ratios, and proportions.
5. Demonstrate an understanding of the coordinate system.
6. Factor simple polynomials. (optional)
7. Demonstrate an understanding of simple geometric figures.

PACING CHART

	Topic:	Number of Weeks:
FIRST SEMESTER		
I.	Number Concepts	2
II.	Operations on Whole Numbers	2
III.	Rational Numbers	4
IV.	Decimals	3
V.	Percents	5
VI.	Measurement	2
SECOND SEMESTER		
VII.	Introduction to Algebra	6
VIII.	Linear Equations and Inequalities	6
IX.	Coordinate System	2
X.	Factoring	Optional
XI.	Informal Geometry	2

The Math II course should include, but is by no means limited to, the objectives outlined here. The optional objectives are recommended for use when time and/or student ability permit.

The sample activities provided are intended to be representative only and are not meant to be a comprehensive collection of student activities.

MATHEMATICS II

CURRICULUM OUTLINE AND PERFORMANCE OBJECTIVES

CURRICULUM OUTLINE[1]	PERFORMANCE OBJECTIVES
I. Number Concepts (Page 12)	To determine a basic understanding of number concepts, the student will be able to:
A. Place Value	A. Recognize place value through millions.
B. Round Natural Numbers	B. Round natural numbers to any specified place through millions.
II. Operations on Whole Numbers (Pages 13-14)	To demonstrate a basic understanding of whole numbers, the student will be able to:
A. Addition	A. Find the sum of columns of whole numbers by performing the indicated addition.
B. Subtraction	B. Find the difference of two whole numbers by performing the indicated subtraction.
C. Multiplication	C. Find the product of two whole numbers by performing the indicated product.
D. Division	D. Find the quotient of two whole numbers by performing the indicated division.
E. Application	E. Solve verbal problems that involve whole numbers.
III. Rational Numbers (Pages 15-20)	To demonstrate a basic understanding of rational numbers, the student will be able to:
A. Definition	A. Define a rational number.
B. Proper and Improper	B. Identify proper and improper fractions.
C. Mixed Numbers	C. Write improper fractions as mixed numbers and mixed numbers as improper fractions.

[1]NOTE: Parentheses indicate page numbers of corresponding activities.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
D. Tests for Divisibility	D. Apply the tests for divisibility to determine if a natural number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10.
E. Factors of Natural Numbers	E. Factor composite natural numbers into the product of primes.
F. Greatest Common Factor	F. Find the greatest common factor of two or more natural numbers.
G. Least Common Multiple (denominator)	G. Find the least common multiple of two or more natural numbers.
H. Equivalent Fractions and Reducing	H. Write one or more fractions that are equivalent to a given fraction including reducing fractions.
I. Addition	I. Add two or more fractions.
1. Same denominators	1. The same deonominator
A. Proper Fractions B. Mixed Numbers	A. Proper Fractions B. Mixed Numbers
2. Different denominators	2. Different denominators
A. Proper Fraction B. Mixed Numbers	A. Proper Fractions B. Mixed Numbers
3. Application	3. Solve verbal problems
J. Subtraction	J. Subtract rational numbers.
1. Same denominator	1. The same denominator
A. Proper Fractions B. Mixed Numbers	A. Proper Fractions B. Mixed Numbers
2. Different denominators	2. Different denominators
A. Proper Fractions B. Mixed Numbers	A. Proper Fractions B. Mixed Numbers

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
3. Borrowing	3. The fractional part of the minuend smaller than the subtrahand
A. Whole numbers B. Mixed numbers	A. Whole number minuend B. Mixed number minuend
4. Applications	4. Solve verbal problems.
K. Multiplication and Applications	K. Multiply two or more fractions and solve verbal problems.
L. Division and Applications	L. Divide fractions, and solve verbal problems.
M. Compare	M. Compare and/or order two or more fractions.
IV. Decimals (Pages 20-24)	To demonstrate an understanding of decimals, the student will be able to:
A. Place Value	A. Recognize place value through ten-thousandths.
B. Compare	B. Compare and/or order two or more decimal numbers.
C. Read and Write	C. Read and write decimal numbers.
D. Round Decimals	D. Round decimals to a designated place value.
E. Addition and Subtraction	E. Find the sum or difference of two or more decimal numbers, including verbal problems.
F. Multiplication	F. Find the product of decimal numbers.
G. Division	G. Find the quotient of decimal numbers.
H. Applications	H. Solve verbal problems.
I. Conversions	I. Write fractions as decimals and decimals as fractions.
J. Fractions and Decimals	J. Perform the four basic operations with fractions and decimals in the same problem.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
V. Percent (Pages 24-27)	To demonstrate a basic understanding of percent, the student will be able to:
A. Definition	A. Define percent.
B. Conversions	B. Write percents as decimals, decimals as fractions, and vice versa.
C. Percent of a Number	C. Find a percent of a number.
D. Percent one Number is of Another	D. Find what percent one number is of another.
E. Number if a Percent of it is Known	E. Find a number if a percent of it is known.
F. Applications	F. Solve verbal problems.
	1. Percent increase and percent decrease
	2. Discount
	3. Profit and loss
	4. Commission
	5. Simple interest
	6. Sales tax and property tax
	7. Banking
	8. Compound interest
	9. Installment purchases
	10. Comparison shopping
	11. Home ownership
	12. Budget management

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
VI. Introduction to Algebra (Pages 27-31)	To demonstrate an understanding of algebra, the student will be able to:
A. Absolute Value	A. Find the absolute value of any real number.
B. Operations on Real (signed) Numbers	B. Demonstrate a basic understanding of real (signed) numbers.
1. Addition	1. Add two or more real numbers.
2. Subtraction	2. Subtract real numbers.
3. Multiplication and Division	3. Multiply and divide integers.
C. Order of Operation	C. Apply the rules of order of operations.
D. Evaluate	D. Evaluate an algebraic expression given a replacement set for the variable(s).
E. Operations on Polynomials	E. Perform operations on polynomials.
1. Definition of Exponents	1. Define exponent.
2. Combine Similar Terms	2. Add and subtract polynomials.
3. Multiplication of Monomials	3. Multiply two or more monomials.
4. Multiplication of Polynomial by Monomial (Distributive Property)	4. Multiply a polynomial by a monomial.
5. Divide Monomials	5. Divide a monomial by a monomial.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
VII. Linear Equations and Inequalities in One Variable (Pages 31-35)	To demonstrate an understanding of linear equations and inequalities in one variable, the student will be able to:
A. Solving Equation	A. Solve a simple equation.
1. Addition Property of Equality	1. Addition property of equality
2. Multiplication Property of Equality	2. Multiplication property of equality
3. Equations Using Two Properties	3. Combination of addition and multiplication properties of equalities
4. Distributive Property	4. Distributive property
B. Ratio and Proportion	B. Solve ratio and proportion problems.
1. Definition	1. Define a ratio and a proportion.
2. Ratio	2. Find the ratio of two numbers.
3. Missing Terms in Proportion	3. Find missing terms in proportions.
C. Translate	C. Translate verbal expressions.
1. Algebraic Expressions	1. Verbal expressions to algebraic expressions and algebraic expressions to verbal expressions
2. Equations	2. Verbal expressions to equations
D. Evaluate Formulas	D. Find the value of a variable in selected formulas.
E. Application	E. Use linear equations to solve verbal problems.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
F. Linear Inequalities (Optional)	F. Work with linear inequalities.
1. Solve Inequalities	1. Find the solution set of a linear inequality in one variable.
2. Graph	2. Graph the solution set of a linear inequality in one variable.
VIII. Coordinate System (Pages 35-37)	To demonstrate an understanding of a two dimensional coordinate system, the student will be able to:
A. Plotting Points	A. Locate and relate points in a plane with ordered pairs of numbers.
B. Linear Equation in Two Variables	B. Sketch the graph of a linear equation.
C. Solution of Systems of Equations (Optional)	C. Find the solution set of a system of equations.
1. Graphing	1. Graphing
2. Algebraic Methods	2. The addition and subtraction method
IX. Factoring (Optional) (Pages 37-39)	To demonstrate an understanding of factoring, the student will be able to:
A. Multiply Two Binomials	A. Multiply a binomial by a binomial.
B. Divide Polynomial	B. Divide a polynomial by a monomial.
C. Greatest Common Factor (G.C.F.)	C. Find the greatest common factor of two or more integers and/or monomials.
D. Factoring out the G.C.F.	D. Use the distributive property to remove monomial factors from the terms of a polynomial.
E. Difference of Two Squares	E. Factor polynomials that are the difference of two squares.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
F. Trinomial	F. Factor selected trinomials having a leading coefficient of one.
X. Informal Geometry (Pages 39-45)	To demonstrate an understanding of geometry, the student will be able to:
A. Points, Lines and Planes	A. Work with points, lines, and planes.
1. Notation and Terminology	1. Use proper notation to name points and subsets of lines and planes.
2. Identification	2. Identify the union and intersection of lines and/or planes and various subsets of lines.
B. Angles and Triangles	B. Work with angles and triangles.
1. Angles	1. Name and classify angles as acute, obtuse, or right.
2. Triangle	2. Name and classify a triangle according to the lengths of its sides or the measure of its angles.
C. Perimeter	C. Find the perimeter of triangles, rectangles, squares, parallelograms, and trapezoids.
D. Circumference	D. Find the circumference of circles.
E. Area	E. Find the area of triangles, squares, rectangles, parallelograms, trapezoids, and circles.
F. Congruent Triangles (Optional)	F. Understand the concept of congruent triangles.
1. Definition	1. Define congruent triangles.
2. Theorem	2. Identify three methods for proving triangles congruent.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
G. Similar Polygons (Optional)	G. Understand the concept of similar polygons.
1. Definition	1. Define similar polygons.
2. Scaled Drawings	2. Use the properties of similar polygons to make scaled drawings.
H. Pythagorean Theorem (Optional)	H. Apply the Pythagorean Theorem to find the lengths of sides of right triangles. (By using the square root table)

ACTIVITIES

The sample items included in this Activities Section are presented as examples of problems which are indicative of the skills listed in the curriculum objectives. They are not intended to be comprehensive.

ACTIVITIES

I. A. CONTENT: Number Concepts; Place Value

OBJECTIVE: The student will be able to recognize place value through millions.

ACTIVITIES: (a) Name the place value of the underlined digit in each of the following.

(1) 5,432

(2) 235,486

(3) 305,728

(4) 226,328,427

(b) Name the place value for each digit in each of the following.

(1) 9,328

(2) 407,222

(3) 56,984,254

I. B. CONTENT: Number Concepts; Round Natural Numbers

OBJECTIVE: The student will be able to round natural numbers to any specified place through millions.

ACTIVITIES: (a) Round the numbers to the nearest ten.

(1) 23

(2) 654

(3) 5,476

(b) Round the numbers to the nearest thousand.

(1) 2,643

(2) 32,476

(3) 8,999

(c) Round the numbers to the nearest million.

(1) 2,567,842

(2) 9,499,999

(3) 247,842,312

II. A. CONTENT: Operations on Whole Numbers; Addition

OBJECTIVE: The student will be able to find the sum of whole numbers.

ACTIVITIES: Find the sum.

(1)	(2)	(3)
348	54,278	464,283
562	27,346	127,845
855	82,764	293,462
723	26,528	899,573

II. B. CONTENT: Operations on Whole Numbers; Subtraction

OBJECTIVE: The student will be able to subtract whole numbers.

ACTIVITIES: Find the difference.

(1)	(2)	(3)	(4)
413	75,380	479,823	5,278,322
283	13,503	289,973	2,984,625

II. C. CONTENT: Operations on Whole Numbers; Multiplication

OBJECTIVE: The student will be able to multiply whole numbers.

ACTIVITIES: Find the product.

(1)	(2)	(3)
34	256	8,475
73	436	358

II. D. CONTENT: Operations on Whole Numbers; Division

OBJECTIVE: The student will be able to divide whole numbers.

ACTIVITIES: Find the quotient. Expressing the remainder is left to the teacher's discretion.

(1) 34,582 ÷ 226

(2) 40,666 ÷ 1,980

(3) 723,565 ÷ 982

II. E. CONTENT: Operations on Whole Numbers; Application

OBJECTIVE: The student will be able to solve verbal problems that involve whole numbers.

ACTIVITIES:

(1) An experienced sales clerk earns $11,375. A beginning clerk earns $8,100 per year. How much more does an experienced clerk earn?

(2) An insurance salesman earns $32.50 for each new contract written. One week he wrote 16 contracts. What were his earnings for that week?

(3) A plot of land contains 87,120 square rods. If it is to be divided into 15 lots of equal size, find the area of each lot.

(4) One diving mask costs $19. How much would 8 diving masks cost?

(5) A boating club buys 32 oars for $832. Find the cost of one oar.

(Just for Fun) In a magic square, the sum of the numbers in each row, column, and diagonal is the same. Complete the magic square below.

32		4	
10	20		16
	12	14	
8		28	2

III. A. CONTENT: Rational Numbers; Definition

OBJECTIVE: The student will be able to:

(a) Define a rational number.

III. B. CONTENT: Rational Numbers; Proper and Improper Fractions

OBJECTIVE: The student will be able to identify proper and improper fractions.

ACTIVITIES: (a) Circle the proper fractions.

(1) $\frac{7}{8}$ (2) $\frac{8}{5}$ (3) $\frac{1}{2}$ (4) 7

(b) Circle the improper fractions.

(1) $\frac{3}{7}$ (2) $\frac{11}{10}$ (3) 5 (4) $\frac{25}{21}$

III. C. CONTENT: Rational Numbers; Mixed Numbers

OBJECTIVE: The student will be able to write improper fractions as mixed numbers and mixed numbers as improper fractions.

ACTIVITIES: (a) Write each mixed number as an improper fraction.

(1) $2\frac{1}{9}$ (2) $3\frac{1}{5}$ (3) $7\frac{2}{7}$ (4) $3\frac{5}{3}$

(b) Write each improper fraction as a mixed number.

(1) $\frac{6}{5}$ (2) $\frac{29}{9}$ (3) $\frac{56}{13}$ (4) $\frac{127}{23}$

III. D. CONTENT: Rational Numbers; Tests for Divisibility

OBJECTIVE: The student will be able to apply tests for divisibility to determine if a natural number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10.

ACTIVITIES: Which of the following numbers are divisible:

(a) by 2?

(1) 234 (2) 481 (3) 5,500

III. D. (Continued)

(b) by 3?

(1) 312 (2) 3,007

(3) 21,729 (4) 10,032,141

(c) by 5?

(1) 5,120 (2) 6,124 (3) 40,055

(d) by 6?

(1) 5,027 (2) 466,102 (3) 427,284,003

(e) by 4?

(1) 2,128 (2) 60,284 (3) 4,507,258

(f) by 8?

(1) 217,000 (2) 7,023,512 (3) 8,002,626

(g) by 9?

(1) 306,198 (2) 2,005,122 (3) 726,104,783

(h) by 10?

(1) 2,050 (2) 6,005 (3) 172,855,260

III. E. CONTENT: Rational Numbers; Factors of Natural Numbers

OBJECTIVE: The student will be able to factor composite natural numbers as the product of primes.

ACTIVITIES: Write each number as the product of primes.

(a) 144

(b) 375

(c) 840

(d) 792

III. F. & G. CONTENT: Rational Numbers; Greatest Common Factor; Least Common Multiple (Denominator)

OBJECTIVE: The student will be able to:

(a) Find the greatest common factor of two or more natural numbers.

(b) Find the least common multiple of two or more natural numbers.

ACTIVITIES: (a) Find the greatest common factor of:

(1) 21 and 35.

(2) 18 and 24.

(3) 15 and 40.

(4) 9, 18, and 45.

(5) 21, 84, and 343.

(6) 65, 91, and 156.

(b) Find the least common multiple of:

(1) 12 and 18.

(2) 42 and 48.

(3) 64 and 116.

(4) 60, 30, and 16.

(5) 15, 12, and 45.

III. H. CONTENT: Rational Numbers; Equivalent Fractions and Reducing

OBJECTIVE: The student will be able to:

(a) Write one or more fractions that are equivalent to a given fraction.

(b) To reduce fractions.

ACTIVITIES: (a) Supply the missing information.

(1) $\frac{1}{2} = \frac{?}{4}$ (2) $\frac{3}{8} = \frac{?}{24}$

(3) $\frac{5}{3} = \frac{?}{27}$ (3) $\frac{5}{12} = \frac{?}{24} = \frac{?}{48}$

III. H. (Continued)

(b) Reduce each fraction to lowest terms.

(1) $\frac{10}{12}$ (2) $\frac{15}{45}$ (3) $\frac{60}{84}$

(4) $\frac{105}{235}$ (5) $\frac{62}{93}$ (6) $\frac{135}{144}$

III. I. CONTENT: Rational Numbers; Addition

OBJECTIVE: The student will be able to add two fractions that have:

(a) The same denominator in proper fractions and mixed numbers.

(b) Different denominators in proper fractions and mixed numbers.

(c) Application of this concept.

ACTIVITIES: Add:

(1) $\frac{2}{7}$ + $\frac{3}{7}$

(2) $2\frac{4}{9}$ + $3\frac{2}{9}$

(3) $\frac{1}{4}$ + $\frac{3}{8}$

(4) $5\frac{3}{5}$ + $2\frac{2}{5}$

(5) $8\frac{1}{8}$ + $12\frac{5}{10}$

(6) $3\frac{1}{4}$ + $3\frac{3}{8}$ + $4\frac{1}{9}$

(7) One cookie recipe makes $3\frac{1}{4}$ dozen cookies. Another recipe makes $2\frac{1}{2}$ dozen cookies. How many cookies is this in all?

III. J. CONTENT: Rational Numbers; Subtraction

OBJECTIVE: The student will be able to subtract two fractions that have:

(a) The same denominator in proper fractions and mixed numbers.

III. J. (Continued)

(b) Different denominator in proper fractions and mixed numbers.

(c) Borrowing with whole numbers and mixed numbers.

(d) An application of this concept.

ACTIVITIES: Subtract:

(1) $\frac{7}{9}$ $-\frac{4}{9}$ (2) $5\frac{7}{12}$ $-2\frac{3}{12}$ (3) $\frac{5}{6}$ $-\frac{2}{9}$ (4) 7 $-\frac{5}{6}$ (5) $6\frac{3}{10}$ $-2\frac{7}{8}$

(6) Sam hiked $4\frac{1}{6}$ miles and Ann hiked 6 miles How much farther did Ann hike?

III. K. CONTENT: Rational Numbers; Multiplication, Division

OBJECTIVE: The student will be able to multiply and divide fractions and solve verbal problems using fractions.

ACTIVITIES: Perform the indicated operations.

(1) $\frac{3}{4} \times \frac{8}{15}$

(2) $2\frac{1}{3} \times 1\frac{1}{5}$

(3) $5 \times 3\frac{1}{10}$

(4) $\frac{9}{10} \div \frac{3}{5}$

(5) $12 \div 3\frac{1}{2}$

(6) $6\frac{1}{4} \div 5$

(7) $5\frac{11}{15} \div 2\frac{4}{5}$

(8) $6\frac{2}{3} \times 4\frac{1}{2} \div 1\frac{3}{4}$

(9) Hazel uses $2\frac{1}{4}$ yards of material to make a dress. How many yards does she need to make six dresses?

III. L. (Continued)

(10) If it takes $\frac{3}{8}$ of a yard of ribbon to trim a dress, how many dresses can be trimmed with $4\frac{1}{2}$ yards of ribbon?

III. M. CONTENT: Rational Numbers; Compare

OBJECTIVE: The student will be able to compare and/or order two or more fractions.

ACTIVITIES: Arrange each set of fractions from least to greatest.

(1) $\frac{2}{3}, \frac{3}{4}, \frac{1}{2}$

(2) $\frac{7}{8}, \frac{2}{3}, \frac{7}{16}$

IV. A. CONTENT: Decimals; Place Value

OBJECTIVE: Recognize place value through ten-thousandths.

ACTIVITIES: Name the place value of each underlined digit.

(1) 0.3<u>7</u>5

(2) 2.<u>0</u>14

(3) 0.741<u>6</u>

(4) 405.90<u>8</u>

IV. B. CONTENT: Decimals; Compare

OBJECTIVE: The student will be able to compare and/or order two or more decimals.

ACTIVITIES: Write the decimals in order from least to greatest.

(a) 6.07, 6.70, .67

(b) .467, .46, .4067

(c) 6.3, 6.030, 6.29

IV. C. CONTENT: Decimals; Read and Write

OBJECTIVE: The student will be able to read and write decimal numbers.

ACTIVITIES: (a) Read and write the decimals.

(1) 3.46 (3) 7.002

(2) 10.101 (4) .0103

(b) Write each decimal in standard form.

(1) Three and five thousandths

(2) Three hundred eighty-four and fifteen-thousandths

(3) Seven hundred and five hundred six ten-thousandths

IV. D. CONTENT: Decimals; Round Decimals

OBJECTIVE: The student will be able to round decimals to a designated place value.

ACTIVITIES: (a) Round to the nearest tenth.

(1) 13.28 (2) 6.73 (3) 506.993

(b) Round to the nearest hundredth.

(1) 8.262 (2) 645.728 (3) 8.996

(c) Round to the nearest thousandth.

(1) 9.4443 (2) 8.5566 (3) 5.3997

IV. E. CONTENT: Decimals; Addition and Subtraction with Applications

OBJECTIVE: The student will be able to:

(a) Find the sum of two or more decimal numbers.

(b) Find the difference of two decimal numbers.

(c) Solve a verbal problem by finding the sum or difference of two decimal numbers.

IV. E. (Continued)

ACTIVITIES: (a) Add:

(1) $\begin{array}{r} 164.346 \\ +\ 7.392 \\ \hline \end{array}$ (2) $\begin{array}{r} 0.896 \\ 0.437 \\ +\ 0.624 \\ \hline \end{array}$

(3) 500.34 + 2075.8 + .0068 + 5012.28

(b) Subtract:

(1) $\begin{array}{r} 15.43 \\ -\ 3.5 \\ \hline \end{array}$ (2) $\begin{array}{r} 609.287 \\ -\ 389.998 \\ \hline \end{array}$ (3) $\begin{array}{r} 12.0560 \\ -\ 9.9897 \\ \hline \end{array}$

(c) (1) John drove 58.4 miles on Saturday and 76.8 miles on Sunday. How many miles did he drive in the two days?

(2) A tablespoon is 20.7 cm long. A teaspoon is 15.3 cm in length. How much longer is the tablespoon?

IV. F. & G. CONTENT: Decimals; Multiplication, Division

OBJECTIVE: The student will be able to:

(a) Find the product of decimal numbers.

(b) Find the quotient of decimal numbers.

ACTIVITIES: (a) Multiply:

(1) $\begin{array}{r} 6.14 \\ \times\ 34 \\ \hline \end{array}$ (2) $\begin{array}{r} 0.256 \\ \times\ 0.348 \\ \hline \end{array}$ (3) $\begin{array}{r} 50.29 \\ \times\ .623 \\ \hline \end{array}$

(b) Divide:

(1) 0.752 ÷ .08 (2) 15.088 ÷ 1.64

(3) 6.104 ÷ 35.287 (4) 0.123 ÷ 4

IV. H. CONTENT: Decimals; Application

OBJECTIVE: Solve Verbal Problems

ACTIVITIES: (1) Allen earned $30.75 working after school for one week. What were his average earnings per day?

IV. H. (Continued)

(2) The sides of a triangle are 3.75 inches, 2.48 inches, and 5.3 inches. What is the perimeter of the triangle?

(3) Sue makes $5.35 an hour. How much would she earn in a 40 hour week?

(4) A pencil weighs 20.5 grams. An eraser weighs 52.3 grams. How much more does the eraser weigh?

IV. I. CONTENT: Decimals; Conversions

OBJECTIVE: The student will be able to write fractions as decimals and decimals as fractions.

ACTIVITIES: (a) Write each decimal as a fraction that is reduced to lowest terms.

(1) .8 (2) .42 (3) $.00\overline{8}$ (4) .125

(5) .625 (6) .0016 (7) $.83\frac{1}{3}$

(b) Write each fraction as a decimal.

(1) $\frac{3}{8}$ (2) $\frac{2}{5}$ (3) $\frac{7}{12}$ (4) $\frac{7}{5}$

IV. J. CONTENT: Fractions and Decimals

OBJECTIVE: Perform the four basic operations with fractions and decimals in the same problem.

(a) Addition

(1) $\frac{3}{4} + .25$

(2) $\frac{3}{8} + .75 + \frac{1}{4}$

(3) $\frac{1}{5} + .6 + .5$

IV. J. (Continued)

(b) Subtraction

(1) $\frac{3}{4} - .5$

(2) $.35 - \frac{1}{5}$

(3) $1.75 - 1\frac{1}{2}$

(c) Multiplication

(1) $\frac{3}{5} \times .4$

(2) $1.75 \times \frac{4}{5}$

(3) $\frac{5}{8} \times .2 \times \frac{4}{5}$

(d) Division

(1) $\frac{1}{2} \div .3$

(2) $1\frac{1}{2} \div 1.2$

(3) $.15 \div \frac{3}{5}$

V. A. & B. CONTENT: Percent, Definition, Conversions

OBJECTIVE: The student will be able to:

(a) Define percent.

(b) Write percents as decimals, decimals as fractions and in reverse order.

V. A. & B. (Continued)

ACTIVITIES: Supply the missing information.

Percent	Decimal	Fraction
70%	?	?
20%	?	?
$87\frac{1}{2}$%	?	?
?	?	$\frac{18}{25}$
?	?	$\frac{7}{8}$
?	.008	?
2.8%	?	?

V. C. CONTENT: Percent; Percent of a Number

OBJECTIVE: The student will be able to find a percent of a number.

ACTIVITIES:

(1) Find 20% of 60.

(2) Find 75% of 380.

(3) Find 250% of 18.

(4) Find $\frac{3}{4}$% of 24.

(5) Find .6% of 1200.

(6) Find $33\frac{1}{3}$% of 600.

(7) Find $9\frac{?}{4}$% of 270.

V. D. CONTENT: Percent; Percent One Number is of Another

OBJECTIVE: The student will be able to find what percent one number is of another.

ACTIVITIES:

(1) What percent of 36 is 9?

(2) 3 is what percent of 600?

(3) 18 is what percent of 12?

V. D. (Continued)

(4) .8 is what percent of 6?

(5) What percent of 4.8 is 1.2?

V. E. CONTENT: Percent; Number if a Percent of it is Known

OBJECTIVE: The student will be able to find a number if a precent of it is known.

ACTIVITIES:

(1) 6 is 20% of what number?

(2) 75% of what number is 240?

(3) $5\frac{1}{2}\%$ of what number if 16.5?

(4) $83\frac{1}{3}\%$ of what number is 90?

(5) 250% of what number is 30?

(6) 24 is $\frac{3}{4}\%$ of what number?

(7) $137\frac{1}{2}\%$ of what number is 220?

(8) $\frac{3}{4}$ of what number is 12?

(9) 60 is $\frac{2}{3}$ of what number?

V. F. CONTENT: Percent; Applications

OBJECTIVE: The student will be able to solve verbal problems that involve percent.

ACTIVITIES:

(a) An article that is purchased for \$40 is sold for \$44. Find the percent of increase.

(b) A jacket was reduced in price from \$75 to \$50. What is the percent of decrease?

(c) Floyd borrowed \$7,500 from the bank at $9\frac{1}{2}$ percent simple interest. If he paid the note 270 days later, how much interest did he pay? (360 day year)

(d) A salesman earns a 6% commission on a home that he sold for \$46,280.00. How much money will he receive?

V. F. (Continued)

(e) Mr. Jones is given a 20% discount on an article whose regular price is $86.00. Find his discount and the amount he paid for the article.

(f) Mrs. Smith purchased $67.80 worth of groceries. If the sales tax is 3%, find the total amount of her bill.

(g) If John invests $2,000 for three years at 8% compounded annually, find the amount of interest he earns.

(h) Mr. Jones bought a lawnmower by paying $40.00 down and $17.00 a month for 9 months. If the sales price of the lawnmower was $175.00, find the amount of the installment charges he paid.

VI. A. CONTENT: Introduction to Algebra; Absolute Value

OBJECTIVE: The student will be able to find the absolute value of a real (signed) number.

ACTIVITIES: (a) Perform the indicated operations.

(1) $|-8| =$ _____

(2) $|+7| =$ _____

(3) $|8 - 2| =$ _____

(4) $|7| - |-2| =$ _____

(b) Find two integers whose absolute value is six.

VI. B. CONTENT: Operations on Real (Signed) Numbers

OBJECTIVE: (a) Add two or more signed numbers.

(b) Subtract two or more signed numbers.

VI. B. (Continued)

(c) Multiply or divide two or more signed numbers.

ACTIVITIES: (a) Find the sum:

(1) $(+4) + (-8)$

(2) $(-8) + (-2)$

(3) $(1\frac{5}{8}) + (-3\frac{3}{4})$

(4) $(+2) + (+6) + (-10)$

(5) $+7$, $+1$

(6) -6.4, -6.25

(7) $-\frac{2}{3}$, $\frac{4}{5}$

(8) -9, $+19$, -25, $+23$, -7

(b) Find the difference:

(1) $7 - 5 =$

(2) $-7 - 8 =$

(3) $8 - (-4) =$

(4) $-5 + 2 - 3 =$

(5) $-1\frac{3}{4} - 2\frac{1}{3}$

(6) 4, -3

(7) -6, -8

(8) 3.4, -1.63

(9) 0, 8

(10) -20, -13

(c) Perform the indicated operations.

(1) $(-13)(+6) =$

(2) $(\frac{4}{5})(-3\frac{3}{4}) =$

(3) $(-2)(-4)(-8) =$

(4) $\frac{-32}{+4}$

(5) $\frac{-3.2}{16}$

(6) $\frac{-144}{(-2)(+8)}$

(7) $\frac{(-4)(-4)(-2)}{(-2)(-2)} =$

VI. C. CONTENT: Order of Operation

OBJECTIVE: The student will be able to apply the rules of Order of Operations.

ACTIVITIES: Simplify these expressions:
(x indicates multiplication)

(1) $-8 - 3 \times 2$

(2) $3 + 7 - 4 \times 2$

(3) $8 \div 2 - 9 \div 3$

(4) $(4 + 5)\, 6$

(5) $\frac{(3x4) + 10}{-2}$

VI. D. CONTENT: Evaluate Algebraic Expressions

OBJECTIVE: Evaluate an algebraic expression given a replacement set for the variable(s).

ACTIVITIES: Evaluate each expression given that $x = 2$ and $y = -3$.

(1) $2x + y$

(2) $x^2 - 2y^2$

(3) $\frac{x + y}{2x - y}$

(4) $2x^3 - y^3$

(5) $(x + y)(x - y)$

VI. E. CONTENT: Operations on Polynomials

OBJECTIVE: The student will be able to:

(a) Define exponent.

(b) Add or subtract polynomials.

(c) Multiply monomials.

(d) Multiply a polynomial by a monomial (distributive property).

(e) Divide a monomial by a monomial.

VI. E. (Continued)

ACTIVITIES: (a) Perform the indicated operations:

(1) $2x + 6x - 3x$

(2) $-6x^2 + 2x^2 - 4x^2 - 8x^2$

(3) $7x + 2 - 3x$

(4) $(2x + 3y) + (-6x - 4y)$

(5) $(5x - 6y) - (2x - 3y)$

(6) $(4y^2 - 2y + 8) + (3y^2 - 8y - 10)$

(7) Add: $4x^2 - 6x + 9$
$\underline{-2x^2 + 2x - 4}$

(8) Subtract: $8x^2 - 2x + 3$
$\underline{-4x^2 - 9x + 2}$

(b) Multiply:

(1) $(x^5)(x^2)$

(2) $(2x^3)(4x^2)$

(3) $(ax^2)(ax^3)$

(4) $(2^3)(2^2)$

(5) $(-3x^2y)(-2xy^2)$

(6) $(6a^2b)(2ab^2)(ab^2)$

(7) $(3a)(2ab)(-ab)$

(c) Find the product:

(1) $-4(x^2 - 2x + 3)$

(2) $2x^2(3x - 2)$

(3) $(-x^3 + 2x^2 - 6x + 5)(-2x)$

(4) $-a^2b(2a^3 - 2ab^2 + 2b^3)$

VI E. (Continued)

(d) Perform the indicated operations and simplify:

(1) $2(x - 3) - 4$

(2) $3x - 2(x + 2) - 5$

(3) $3(x + 2) - 6(x-3)$

(4) $8(x^2 - 2x - 3) - (-2x^2 + 6x - 2) + 3(x - 5)$

(5) $2x^2(x^2 - 3x - 6) - 4x(-2x^3 + 5x^2 - 2)$

(e) Find the quotient:

(1) $\frac{x^4}{x^2}$ (2) $\frac{3x^7}{x^4}$ (3) $\frac{x^{18}}{x^{12}}$

(4) $\frac{12x^2y^4}{6x^2y^2}$ (5) $\frac{3^6}{3^4}$ (6) $-\frac{24x^{16}y^{10}}{12x^8y^6}$

VII. A. CONTENT: Linear Equations and Inequalities in One Variable; Solving Equations

OBJECTIVE: The student will be able to solve equations using:

(a) Addition property of equality.

(b) Multiplication property of equality.

(c) Combination of the addition and multiplication property of equality.

(d) Distributive property.

ACTIVITIES: Solve these equations:

(a)

(1) $x + 8 = 10$

(2) $a - 2 = 5$

(3) $-4 + y = 7$

(4) $18 = y - 3$

(5) $x - 0.3 = 1.8$

VII. A. (Continued)

(6) $2\frac{2}{3} = y - \frac{1}{3}$

(b)

(1) $3x = 9$

(2) $2a = -4$

(3) $-6x = 12$

(4) $\frac{1}{2}b = 6$

(5) $\frac{2}{3}y = -12$

(6) $\frac{a}{7} = 14$

(7) $\frac{-c}{8} = +16$

(8) $\frac{4x}{5} = -2$

(c)

(1) $2x - 4 = 0$

(2) $5 = 3x + 1$

(3) $4n + 3 = 24$

(4) $11n + 2 = .20$

(5) $\frac{n}{2} - 4 = .20$

(6) $6 = \frac{1}{2}x + 3$

(7) $20 = \frac{5}{n} - 4$

(d)

(1) $5(x + 2) = 20$

(2) $8(3x - 1) = 56$

(3) $80 = 2(10 - 3d)$

(4) $7(x + 2) = 5(x + 4)$

(5) $6(3c - 1) = -42$

(6) $3(2b + 1) - 7 = 50$

(7) $4(y - 3) + 3y = 16$

(8) $6x = 2(x + 15) - 12$

VII. B. CONTENT: Linear Equations and Inequalities in One Variable; Ratio and Proportion

OBJECTIVE: The student will be able to:

(a) Define a ratio and a proportion.

(b) Find the ratio of two numbers.

(c) Find missing terms in proportions.

VII. B. (Continued)

ACTIVITIES: (a) Find the ratio of:

(1) 8 to 24.

(2) 6 in. to 36 in.

(3) 8 months to 6 years.

(4) 36 hours to 4 days.

(5) \$.75 to \$6.00

(b) Supply the missing information.

(1) $\frac{1}{2} = \frac{?}{16}$ (2) $\frac{5}{?} = \frac{20}{16}$

(3) $\frac{4}{10} = \frac{14}{?}$ (4) $\frac{3.5}{1.05} = \frac{14}{?}$

(5) $\frac{24}{1\frac{1}{2}} = \frac{?}{2}$ (6) $\frac{?}{5.5} = \frac{2.6}{22}$

(c) (1) A pendulum completes two swings every 3 seconds. How many swings will it make in 60 seconds?

(2) If Paul can pick 2 bushels of peaches in 30 minutes, how many bushels can he pick in 8 hours?

VII. C. CONTENT: Linear Equations and Inequalities in One Variable; Translate

OBJECTIVE: The student will be able to:

(a) Translate verbal expressions to algebraic expressions.

(b) Translate verbal expressions to equations.

ACTIVITIES: (a) Write each of the following as an algebraic expression.

(1) Two more than 3 times n.

(2) Seven diminished by 7 times n.

VII. C. ACTIVITIES: (Continued)

(3) The difference between 2 and b.

(4) The product of b and 7 less than a.

(5) The quotient of r and m.

(6) Three times the sum of r and 2.

(b) Write each of the following as an equation.

(1) Seven times a number is 12 more than 3 times the number.

(2) If you double a number and add 24, the result is 8 times the number.

(3) The difference between 7y and 3y is 20.

(4) A number is multiplied by 3 and then 7 is subtracted. The result is 83.

VII. D. CONTENT: Linear Equations and Inequalities in one Variable; Evaluate Formulas

OBJECTIVE: The student will be able to find the value of a variable in selected formulas.

ACTIVITIES: Find the value of the indicated variable.

(1) If $D = rt$ find r, given that $D = 100$ and $t = 2$

(2) If $t = a + (n - 1)d$ find a, given that $t = 51$, $n = 13$ and $d = 4$

(3) If $C = \frac{5}{9}(F - 32)$ find F, if $C = -40$

(4) If $I = PxRxT$, find R, given that $I = 21$, $P = 7$, and $T = 1$.

(5) If $A = bxh$, find h, given that $A = 84$ and $b = 14$.

VII. E. CONTENT: Linear Equations and Inequalities in One Variable; Application.

OBJECTIVE: The student will be able to use linear equations to solve verbal problems.

VII. E ACTIVITIES: (a) The sum of twice a number and 16 is 86. Find the number.

(b) The sum of two consecutive integers is 35. Find the integers.

(c) Find three consecutive odd integers so that 5 times the greatest decreased by 6 times the least is 9.

(d) Hilda has $2.15 in dimes and quarters. If she has 4 more dimes than quarters, how many dimes does she have?

(e) Bob is twice as old as Emma. If the sum of their ages if 48 years, find the age of each.

VII. F. CONTENT: Linear Equations and Inequalities in One Variable; Linear Inequalities (Optional)

OBJECTIVE: The student will be able to:

(a) Solve linear inequalities in one variable.

(b) Graph the solution set of linear inequalities in one variable.

ACTIVITIES: (a) Find the solution set:

(1) $2x - 6 < x + 3$

(2) $3(x + 2) > 4x$

(3) $4x + 1 + 3x \geq 2x - 4$

(4) $-\frac{3}{4}x < 24$

(5) $3(x-4) - 2(2x - 3) \leq - 3(x + 6)$

(b) Graph the solution set of the exercises of part (a).

VIII. A. CONTENT: Coordinate System; Plotting Points

OBJECTIVE: The student will be able to locate and relate points in a plane to ordered pairs of numbers.

VIII. A ACTIVITIES: Graph each ordered pair:

(1) (-2, 0)

(2) (-3, 2)

(3) (6, 0)

(4) (2, 4)

(5) (0, -2)

(6) (3, -4)

(7) (-4, -3)

VIII. B. CONTENT: Coordinate System; Linear Equation in Two Variables

OBJECTIVE: The student will be able to sketch the graph of a linear equation.

ACTIVITIES: Sketch the graph of these linear equations.

(1) $x = 2$

(2) $y = -3$

(3) $x + y = 9$

(4) $x - y = -4$

(5) $y + 3x = 6$

VIII. C. CONTENT: Coordinate System; Solution of Systems of Equations (Optional)

OBJECTIVE: The student will be able to find the solution set of a system of linear equations by:

(a) Graphing

(b) The addition and subtraction method.

ACTIVITIES: (a) Find the solution set of each system of equations by graphing.

(1) $-2x + 7 = 4$
$x - y = -5$

(2) $x + y = 3$
$2x - y = 9$

VIII. C. (Continued)

(b) Find the solution set of each system of equations by using the addition and subtraction method.

(1) $x + 2y = 8$
$x - 2y = 4$

(2) $a + b = 11$
$3a - 2b = 8$

(3) $5x + 3y = 17$
$4x - 5y = 21$

(4) $3x = 13 - 2y$
$\frac{3y + x}{2} = 8$

IX. A. CONTENT: Factoring; Multiply Two Binomials (Optional)

OBJECTIVE: The student will be able to multiply two binomials.

ACTIVITIES: Multiply:

(1) $(x - 3)(x + 2)$

(2) $(2x - 3)(4x - 2)$

(3) $(3x - 2y)(6x + 5y)$

(4) $(3x - 2)^2$

(5) $(5x + 2y)(5x - 2y)$

(6) $(-2x + 3)(3x - 5)$

IX. B. CONTENT: Factoring; Divide Polynomial by a Monomial. (Optional)

OBJECTIVE: The student will be able to divide a polynomial by a monomial.

ACTIVITIES: (1) $\frac{3x - 15}{3}$

(2) $\frac{8b + 4}{-2}$

(3) $\frac{5x^2 - 10x - 25}{5}$

IX. B. (Continued)

(4) $\frac{x^2 + 6x}{x}$

(5) $\frac{4x^2 - 12x}{-2x}$

(6) $\frac{-12y^3 + 6y^2 - 8y}{-2y}$

(7) $\frac{32a^2b^3 - 16ab^4 + 8ab}{-8ab}$

(8) $\frac{4x^4 - 2x^3 + 8x^2}{-2x^2}$

IX. C. CONTENT: Factoring; Greatest Common Factor (G.C.F.) (Optional)

OBJECTIVE: The student will be able to find the G.C.F. of two or more monomials.

ACTIVITIES: Find the G.C.F. of each of the following:

(1) $2x$, $4x$

(2) $16x^2$, $8xy^3$

(3) $10x^4y^5$, $5x^3y^8$

(4) $6x^2$, $9x^4y$, $3x^2y^4$

(5) $10x^2y^4$, $5xy^3$, $25x^2y^4$

IX. D. CONTENT: Factoring; Factoring Out the G.C.F. (Optional)

OBJECTIVE: The student will be able to use the distributive property to remove monomial factors from the terms of a polynomial.

ACTIVITIES: Factor out the greatest common factor.

(1) $2x - 4$

(2) $3x^2 - 6x$

(3) $2ax^2 - 4ax + 8a$

(4) $12c^2 - c$

(5) $5r^2s - 10rs^2$

(6) $x^3 - x^2$

IX. E. & F. CONTENT: Factoring; Differences of Two Squares; Trinomials (Optional)

OBJECTIVE: The student will be able to:

(a) Factor polynomials that are the difference of two squares;

(b) Factor selected trinomials having a leading coefficient of one.

ACTIVITIES: (a) Factor:

(1) $x^2 - 9$ (3) $16a^2 - 25$

(2) $x^2 - y^2$ (4) $4r^2s^2 - 9$

(b) Factor each trinomial.

(1) $x^2 + 7x + 12$ (4) $a^2 - 9a + 20$

(2) $x^2 - 8x + 7$ (5) $n^2 - 5n - 50$

(3) $x^2 - 6x - 7$ (6) $x^2 + 12x + 35$

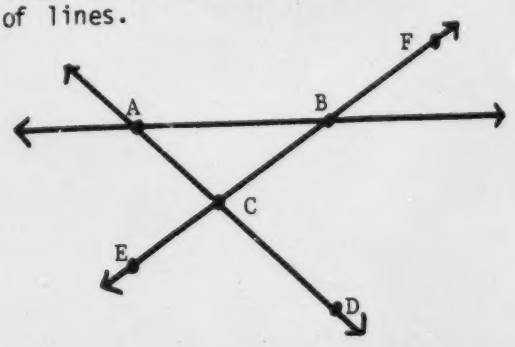
X. A. CONTENT: Geometry; Points, Lines, and Planes

OBJECTIVE: The student will be able to:

(a) Use proper notation to name points, and subsets of lines and planes;

(b) Identify the union and intersection of lines and/or planes and various subsets of lines.

ACTIVITIES:



(a) Use the diagram to answer the following:

(1) Name 3 lines in the diagram.

X. A. (Continued)

(2) What is the intersection of $\overline{BE}$ and $\overline{BC}$?

(3) Name two rays those endpoints are point C.

(4) Find the intersection of $\overline{CB}$ and $\overline{BC}$.

(5) Name two segments whose union is $\overline{AD}$.

(6) What is the union of $\overline{CF}$ and $\overline{CE}$?

(b) How many planes can contain:

(1) Three collinear points?

(2) Three noncollinear points?

(3) Two intersecting lines?

(4) A line and a point not on it?

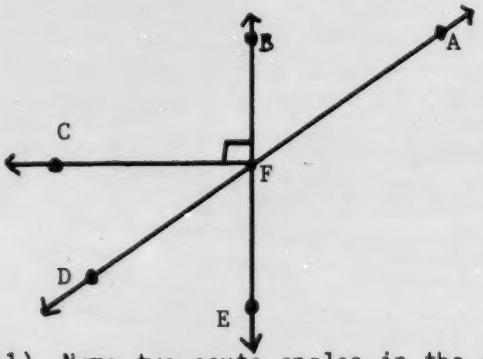
X. B. CONTENT: Geometry; Angles, and Triangles

OBJECTIVE: The student will be able to:

(a) Name and classify angles as acute, obtuse, or right.

(b) Name and classify a triangle according to the length of its sides or the measure of its angles.

ACTIVITIES:



(1) Name two acute angles in the diagram.

(2) Name two right angles in the diagram.

(3) Name two obtuse angles in the diagram.

X. B. (Continued)

(b) Which of the following statements are true?

(1) Every equilaterial triangle is isosceles.

(2) Every isosceles triangle is equilateral.

(3) A right triangle may be isosceles.

(4) An acute triangle may be isosceles.

(5) An obtuse triangle may also contain a right angle.

(6) An equilateral triangle may be obtuse.

X. C. CONTENT: Geometry; Perimeter

OBJECTIVE: The student will be able to find the perimeter of triangles, rectangles, squares, parallelograms, and trapezoids.

ACTIVITIES: (a) Find the length of a side of a square whose perimeter is 36 inches.

(b) Find the perimeter of a parallelogram which has two consecutive sides 3 inches and 2 inches, respectively.

X. D. CONTENT: Geometry; Circumference

OBJECTIVE: The student will be able to find the circumference of a circle.

ACTIVITIES: (a) Find the circumference of a circle whose radius is 5 cm. (use 3.14 for π)

(b) Find the circumference of a circle whose diameter is 14 inches. (Use $\frac{22}{7}$ for π)

X. E. CONTENT: Geometry; Area

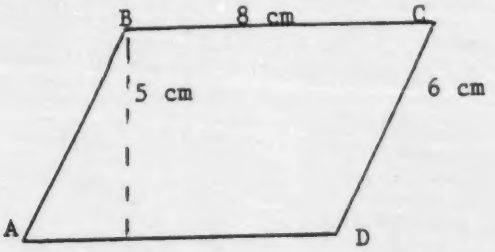
OBJECTIVE: The student will be able to find the area of triangles, squares, rectangles, parellograms, trapezoids, and circles.

ACTIVITIES: (a) Find the area of a rectangle with a length of 16 inches and a width of 12 inches.

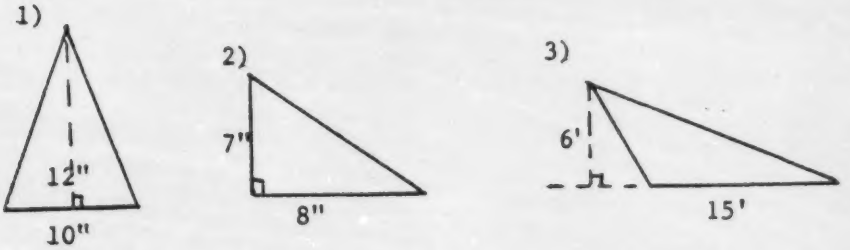
X. E. ACTIVITIES: (Continued)

(b) Give the area of a square with a side of length 6 feet.

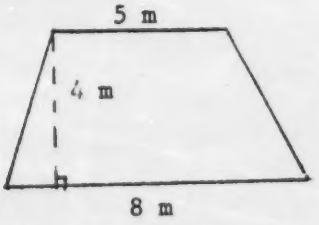
(c) Give the area of parallelogram ABCD.



(d) Find the area of each triangle.



(e) Find the area of this trapezoid.



(f) Find the area of a circle whose radius is 9 cm. (Use 3.14 for π)

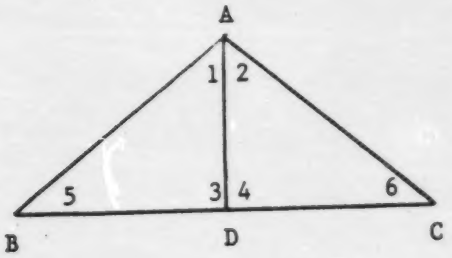
X. F. CONTENT: Geometry; Congruent Triangles (Optional)

OBJECTIVE: The student will be able to:

(a) Define congruent triangles.

(b) Identify three methods of proving triangles congruent.

ACTIVITIES:



State the method (S. S. S., A. S. A. or S. A. S.) by which you can prove $\triangle ABD \cong \triangle ACD$ if:

(1) AB = AC, BD = DC

(2) AB = AC, 1 = 2

(3) 1 = 2, 3 = 4

(4) 5 = 6, BD = DC, AB = AC

(5) BD = DC, 3 = 4

X. G. CONTENT: Geometry; Similar Polygons (Optional)

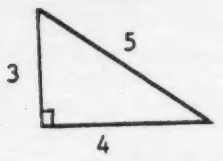
OBJECTIVE: The student will be able to:

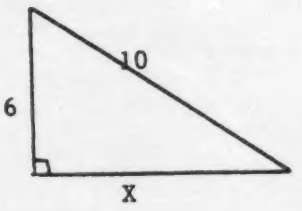
(a) Define similar polygons.

(b) Use the properties of similar poylgons to make scaled drawings.

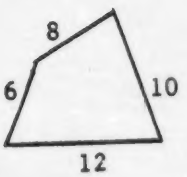
X. G. ACTIVITIES:

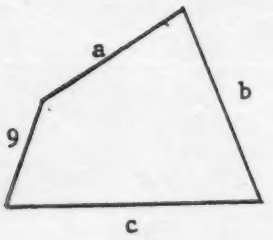
(1)





(2)





(b) If the scale 1 in. = 16 miles, what distance is represented by:

(1) 2 in.

(2) $4\frac{1}{2}$ in.

(3) 3/4 in.

(4) $2\frac{5}{8}$ in.

(c) On a map, a distance of 44 miles is represented by a segment 2-3/4 inches long. How long should a segment be to represent a distance of 64 miles?

(d) The scale of a blueprint of a rectangular room is 1/8" = 2 ft. Find the actual dimensions of a room that measures 2-15/16 inches by 3-3/8 inches.

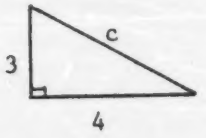
(e) Draw a floor plan of a room that is 17 ft. long by 15 ft. wide using the scale 1/4" = 1 ft.

X. H. CONTENT: Geometry; Pythagorean Theorem (Optional)

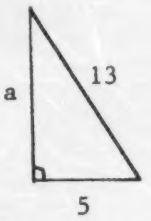
OBJECTIVE: The student will be able to apply the Pythagorean Theorem to find lengths of sides of triangles. (By using a square root table)

ACTIVITIES: Find the length of the missing side.

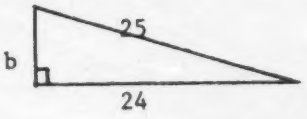
(a)



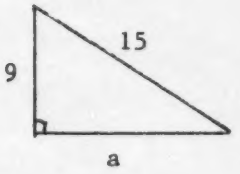
(b)



(c)



(d)



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EVALUATIVE TECHNIQUES

EVALUATIVE TECHNIQUES

The importance of regular and frequent evaluation is nowhere more obvious than in the area of mathematics where skills are built in a cumulative manner. Frequent short quizzes should be used to determine understanding and mastery of each concept as it is taught. Longer tests covering related concepts and their relevance in problem solving should be administered at the conclusion of each unit. Comprehensive examinations covering all concepts and skills are very important at the end of each semester and at the end of each year. The sample items in the activities section of this guide represent ideas for examination problems but are by no means recommended for use as they are presented in this book. These evaluative techniques are to be used to measure the degree of achievement by the students with the understanding that there are many other types of tools for the measurement of student progress in achieving curricular objectives.

A basic goal in teaching mathematics should be to aid the student in becoming a competent problem solver. It is not enough to teach mathematical skills. The student must also be provided an opportunity to practice the application of these mathematical skills to successfully solve problems. The student's ability to solve problems logically should be evaluated regularly since it is a lifetime skill which carries over into all areas of living.

MATHEMATICS II

ANSWER KEY

FOR

ACTIVITIES

MATH II ANSWER KEY

I. A. (a) 1) thousand
2) hundred thousand
3) hundred
4) hundred million

(b) 1) 9 - thousands
3 - hundreds
2 - tens
8 - ones

2) 4 - hundred thousands
0 - ten thousands
7 - thousands
2 - hundreds
2 tens
2 ones

3) 5 - ten millions
6 - millions
9 - hundred thousands
8 - ten thousands
4 - thousands
2 - hundreds
5 - tens
4 - ones

B. (a) 1) 20 2) 650 3) 5,480
(b) 1) 3,000 2) 32,000 3) 9,000
(c) 1) 3,000,000 2) 9,000,000 3) 248,000,000

II. A. 1) 2,488 2) 190,916 3) 1,785,163
B. 1) 130 2) 61,877 3) 189,850 4) 2,293,697
C. 1) 2,482 2) 111,616 3) 3,034,050
D. 1) 153 R4 2) 20 R1066 3) 736 R813
E. 1) \$3,275 2) \$520 3) 5808 sq. rods 4) \$152
5) \$26

Just for Fun

32	$\frac{6}{20}$	4	$\frac{26}{16}$
10	12	$\frac{22}{14}$	$\frac{24}{2}$
$\frac{18}{8}$	$\frac{30}{}$	28	

III. A. (a) Rational Number: Any number that can be expressed in the form $\frac{a}{b}$, where $b \neq 0$

B. (a) 1 and 3
(b) 2 and 4

C. (a) 1) $\frac{19}{9}$ 2) $\frac{16}{5}$ 3) $\frac{51}{7}$ 4) $\frac{14}{3}$

(b) 1) $1\frac{1}{5}$ 2) $3\frac{2}{9}$ 3) $4\frac{4}{13}$ 4) $5\frac{12}{23}$

III. (Continued)

D. (a) 1, 3
(b) 1, 3, 4
(c) 1, 3
(d) none
(e) 1, 2
(f) 1, 2
(g) 1
(h) 1, 3

E. (a) $2^4 \times 3^2$ or $2 \times 2 \times 2 \times 2 \times 3 \times 3$

(b) 3×5^3 or $3 \times 5 \times 5 \times 5$

(c) $2^3 \times 3 \times 5 \times 7$ or $2 \times 2 \times 2 \times 3 \times 5 \times 7$

(d) $2^3 \times 3^2 \times 11$ or $2 \times 2 \times 2 \times 3 \times 3 \times 11$

F. & G. (a) 1) 7
2) 6
3) 5
4) 9
5) 7
6) 13

(b) 1) 36
2) 168
3) 1,856
4) 240
5) 180

H. (a) 1) 2 2) 9 3) 45 4) 10,20

(b) 1) $\frac{5}{6}$ 2) $\frac{1}{3}$ 3) $\frac{5}{7}$ 4) $\frac{21}{47}$

5) $\frac{2}{3}$ 6) $\frac{15}{16}$

I. 1) $\frac{5}{7}$ 2) $5\frac{2}{3}$ 3) $\frac{5}{8}$ 4) 8

5) $20\frac{5}{8}$ 6) $10\frac{53}{72}$ 7) $5\frac{3}{4}$ dozen or 69 cookies

J. 1) $\frac{1}{3}$ 2) $3\frac{1}{3}$ 3) $\frac{11}{18}$ 4) $6\frac{1}{6}$

5) $3\frac{17}{40}$ 6) $2\frac{8}{15}$ miles

K. & L. 1) $\frac{2}{5}$ 2) $2\frac{4}{5}$ 3) $15\frac{1}{2}$ 4) $1\frac{1}{2}$

5) $3\frac{3}{7}$ 6) $1\frac{1}{4}$ 7) $2\frac{1}{21}$ 8) $17\frac{1}{7}$

9) $13\frac{1}{2}$ yds. 10) 12 dresses

III. (Continued)

M. 1) $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$ 2) $\frac{7}{16}, \frac{2}{3}, \frac{7}{8}$

IV. A. 1) hundredths 3) ten-thousandths
2) tenths 4) thousandths

B. (a) .67, 6.07, 6.7
(b) .4067, .46, .467
(c) 6.030, 6.29, 6.3

C. (a) 1) Three and forty-six hundredths
2) Ten and one hundred one thousandths
3) Seven and two thousandths
4) One hundred three ten-thousandths

(b) 1) 3.005 2) 384.015 3) 700.0506

D. (a) 1) 13.3 2) 6.7 3) 507
(b) 1) 8.26 2) 645.73 3) 9.00
(c) 1) 9.444 2) 8.557 3) 5.400

E. (a) 1) 171.738 2) 1.957 3) 7586.4268
(b) 1) 11.93 2) 219.289 3) 2.0663
(c) 1) 135.2 miles 2) 5.4 cm. longer

F. (a) 1) 208.76 2) .089088 3) 31.33067
& G. (b) 1) 9.4 2) 9.2 3) .1729815 4) .03075

H. 1) \$6.15 2) 11.53 in. 3) \$214. 4) 31.8 grams

I. (a) 1) $\frac{4}{5}$ 2) $\frac{21}{50}$ 3) $\frac{1}{125}$ 4) $\frac{1}{8}$

5) $\frac{5}{8}$ 6) $\frac{1}{625}$ 7) $\frac{5}{6}$

(b) 1) .375 2) .4 3) $.58\overline{3}$ 4) 1.4

J. (a) 1) 1 2) 1.375 or $1\frac{3}{8}$ 3) 1.3 or $1\frac{3}{10}$

(b) 1) .25 or $\frac{1}{4}$ 2) .15 or $\frac{3}{20}$ 3) .25 or $\frac{1}{4}$

(c) 1) .24 or $\frac{6}{25}$ 2) 1.4 or $1\frac{2}{5}$ 3) .1 or $\frac{1}{10}$

(d) 1) $1.\overline{6}$ or $1\frac{2}{3}$ 2) 1.25 or $1\frac{1}{4}$ 3) .25 or $\frac{1}{4}$

		Percent	Decimal	Fraction
V. A.			.7	7/10
			.2	1/5
			.875	7/8
		72%	.72	
		87.5%	.875	
		.8%		1/125
			.028	7/250

C. 1) 12 2) 285 3) 45 4) .18

5) 7.2 6) 200 7) 26.325

D. 1) 25% 2) .5% 3) 150% 4) $13\frac{1}{3}\%$

5) 25%

E. 1) 30 2) 320 3) 300 4) 108

5) 12 6) 3200 7) 160 8) 16

9) 90

F. a) 10% b) $33\frac{1}{3}$ % c) \$534.38 d) \$2,776.80
e) \$17.20, \$68.80 f) \$69.83 g) \$519.42 h) \$18

VI. A (a) 1) 8 2) 7 3) 6 4) 5
(b) 6 and -6

B. (a) 1) -4 2) -10 3) $-2\frac{1}{8}$ 4) -2

5) 8 6) -12.65 7) $\frac{2}{15}$ 8) 1

(b) 1) 2 2) -15 3) 12 4) -6

5) $-4\frac{1}{12}$ 6) 7 7) 2 8) 5.03

9) -8 10) -7

(c) 1) -78 2) -3 3) -64 4) -8

5) -.2 6) 9 7) -8

C. 1) -14 2) 2 3) 1 4) 54
5) -11

D. 1) 1 2) -14 3) $-\frac{1}{7}$ 4) 43
5) -5

VI. (Continued)

E. (a) 1) $5x$ 2) $-16x^2$

3) $4x + 2$ 4) $-4x-y$

5) $3x - 3y$ 6) $7y^2 - 10y - 2$

7) $2x^2 - 4x + 5$ 8) $12x^2 + 7x + 1$

(b) 1) x^7

2) $8x^5$

3) a^2x^5

4) $2^5 = 32$

5) $6x^3y^3$

6) $12a^4b^5$

7) $-6a^3b^2$

(c) 1) $-4x^2 + 8x - 12$ 2) $6x^3 - 4x^2$

3) $2x^4 - 4x^3 + 12x^2 - 10x$

4) $-2a^5b + 2a^3b^3 - 2a^2b^4$

(d) 1) $2x - 10$ 2) $x - 9$

3) $-3x + 24$ 4) $10x^2 - 19x - 37$

5) $10x^4 - 26x^3 - 12x^2 + 8x$

(e) 1) x^2 2) $3x^3$ 3) x^6

4) $2y^2$ 5) 3^2 or 9 6) $-2x^8y^4$

VII. A. (a) 1) $x = 2$ 2) $a = 7$ 3) $y = 11$

4) $y = 21$ 5) $x = 2.1$ 6) $y = 3$

(b) 1) $x = 3$ 2) $a = -2$ 3) $x = -2$ 4) $b = 12$

5) $y = -18$ 6) $a = 98$ 7) $c = -128$ 8) $x = -2\frac{1}{2}$

(c) 1) $x = 2$ 2) $x = 1\frac{1}{3}$ 3) $n = 5\frac{1}{4}$ 4) $n = -\frac{9}{55}$

5) $n = 8.4$ 6) $x = 6$ 7) $n = \frac{5}{24}$

VII. A (Continued)

(d) 1) $x = 2$ 2) $x = 2\frac{2}{3}$ 3) $d = -10$ 4) $x = 3$

5) $c = -2$ 6) $b = 9$ 7) $y = 4$ 8) $x = 4\frac{1}{2}$

B. (a) 1) $\frac{1}{3}$ 2) $\frac{1}{6}$ 3) $\frac{1}{9}$ 4) $\frac{3}{8}$

5) $\frac{1}{8}$

(b) 1) 8 2) 4 3) 35 4) 4.2
5) 32 6) .65

(c) 1) 40 swings 2) 32 bushels

C. (a) 1) $2 + 3n$ 2) $7 - 7n$ 3) $2 - b$

4) $b(a - 7)$ 5) $\frac{r}{m}$ 6) $3(r + 2)$

(b) 1) $7n = 3n + 12$ 2) $2n + 24 = 8n$

3) $7y - 3y = 20$ 4) $3n - 7 = 83$

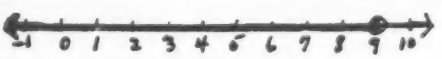
D. 1) $r = 50$ 2) $a = 3$ 3) $F = -40$

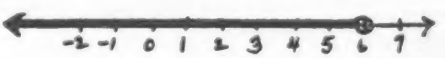
4) $R = 3$ 5) $n = 6$

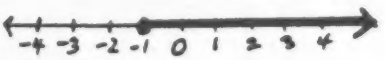
E. (a) 35 (b) 17, 18 (c) 11, 13, 15

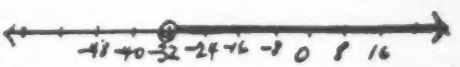
(d) 9 dimes (e) Emma is 16 years old; Bob is 32 years old.

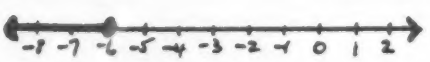
F. (a) 1) $x < 9$ 2) $x < 6$ 3) $x \geq -1$ 4) $x > -32$
5) $x \leq -6$

(b) 1) 

2) 

3) 

4) 

5) 

VIII. A.
B.
C. (a) } Should be done on graph paper

(b) 1) (6, 1) 2) (6 , 5) 3) (4, -1) 4) (1, 5)

IX. A. 1) $x^2 - x - 6$

2) $8x^2 - 16x + 6$

3) $18x^2 + 3xy - 10y^2$

4) $9x^2 - 12x + 4$

5) $25x^2 - 4y^2$

6) $-6x^2 + 19x - 15$

B. 1) $x - 5$

2) $-4b - 2$

3) $x^2 - 2x - 5$

4) $x + 6$

5) $-2x + 6$

6) $6y^2 - 3y + 4$

7) $-4ab^2 + 2b^3 - 1$

8) $-2x^2 + x - 4$

C. 1) $2x$ 2) $8xy$ 3) $5x^3y^5$ 4) $3x^2y$ 5) $5xy^3$

IX. D. 1) $2(x - 2)$

2) $3x(x - 2)$

3) $2a(x^2 - 2x + 4)$

4) $c(12c - 1)$

5) $5rs(r - 2s)$

6) $x^2(x - 1)$

IX. (Continued)

E. & F. (a) 1) $(x + 3)(x - 3)$ 2) $(x + y)(x - y)$
3) $(4a + 5)(4a - 5)$ 4) $(2rs + 3)(2rs - 3)$

(b) 1) $(x + 3)(x + 4)$ 2) $(x - 1)(x - 7)$
3) $(x + 1)(x - 7)$ 4) $(a - 4)(a - 5)$
5) $(n - 10)(n + 5)$ 6) $(x + 5)(x + 7)$

X. A. (a) 1) $\overleftrightarrow{AB}$, $\overleftrightarrow{AD}$, $\overleftrightarrow{EF}$ 2) $\overline{BC}$ 3) Answers will vary

4) $\overline{BC}$ or $\overline{CB}$ 5) $\overline{AC}$ & $\overline{CD}$ 6) $\overline{EF}$

(b) 1) an infinite number 2) one
3) one 4) one

B. (a) 1) Answers will vary 2) Answers will vary
3) Answers will vary

(b) 1) T 2) F 3) T 4) T 5) F 6) F

C. (a) 9 inches (b) 10 inches

D. (a) 31.4 cm. (b) 44 inches

E. (a) 192 square in. (b) 36 square ft. (c) 40 square cm.

(d) (1) 60 square in. (2) 28 square in. (3) 45 square ft.

(e) 26 square m. (f) 254.34 square cm.

F. 1) SSS 2) SAS 3) ASA
4) SSS or SAS 5) SAS

G. (a) 1) $x = 8$ 2) $a = 12$, $b = 15$, $c = 18$

(b) 1) 32 miles 2) 72 miles 3) 12 miles 4) 42 miles

(c) 4 inches

(d) $47' \times 54'$

(e) drawing

H. (a) $c = 5$
(b) $a = 12$
(c) $b = 7$
(d) $x = 12$